



UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/532,022 03/21/00 SUDOH

Y 35.62558

005514 MM91/0808
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NEW YORK NY 10112

EXAMINER

NGUYEN, H

ART UNIT

PAPER NUMBER

2851

DATE MAILED:

08/08/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/532,022

Applicant(s)

SUDOH ET AL

Examiner

Henry Hung V Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of group I (claims 1-11) in Paper No. 5 is acknowledged. The traversal is on the ground(s) that group I and group II are "so closely related in the field projection exposure." Upon reconsideration of this restriction requirement, the new assigned examiner recognizes that claims 12-30 (of group II) are merely inherent method of the claimed apparatus (of group I) and has decided that it would be more beneficial to the office, public and the applicant to examine all claims as originally filed and avoid the possibility of multiple patents to relatively a same invention. Thus, the restriction made 6/27/2001 by Examiner Christopher Young is hereby vacated.

Specification

2. The disclosure should be carefully reviewed and ensure that any and all grammatically, idiomatic, and spelling or other minor errors are corrected. For instance, on page 9, line 1, reference to "it can be determined found" should read --it can be determined--. Correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 1-4, 6-8, 11-15, 17-19 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ushida et al (U.S.Pat. 5,530,518) in view of Shiraishi (U.S.Pat. 6,020,950).

With regard to claims 1-4, 6-8, 11-15, and 22 Ushida et al (fig.1) discloses an projection exposure apparatus comprising: a projection optical system (10) for projection a pattern formed on a reticle (9) onto a photosensitive substrate (11) and a diaphragm (10a) for setting the numerical aperture of the projection optical system. Ushida lacks to show a mechanism for controlling the temperature of the diaphragm. Shiraishi (figs 4 and 5) teaches a projection optical system having a cooling member (see fig.5) for cooling the light shielding plate arranged therein whereby "the system is free from heat generation caused by light absorption" (see col.5, lines 15-18) wherein the cooling means comprises a cooling fluid circulation system (Ko,Ki).

With respect to claims 6 and 17, it is noted that the temperature of fluid is controlled (see col.14, lines 5-7). Therefore, a temperature sensor is an inherent device of the cooling means to detect the temperature information of the light shielding plate.

As to claims 7-8, and 18-19, it is the examiner's position that it would have been obvious to a skilled artisan to preferably disposed the temperature sensor on the side facing the substrate. In other words, the sensor is disposed on a plane opposite to the light source whereby the sensor is not influenced by the exposure beam.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Ushida et al and Shiraishi et al to obtain the invention as specified in claims 1-4, 6-8, 11-15, 17-19 and 22 of the instant invention. It would have been obvious to a skilled artisan to utilize the cooling means as taught by Shiraishi into the diaphragm of Ushida so that the numerical aperture diaphragm may be prevented from

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increasing its temperature due to absorption of light and thus a deviation of the projection optical system can be avoided.

5. Claims 5, 9-10 and 16, 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ushida et al (U.S.Pat. 5,530,518) in view of Shiraishi (U.S.Pat. 6,020,950) and further in view of Nishi et al (U.S.Pat. 5,894,341).

As to claims 9-10, and 20-21, Ushida et al as modified by Shiraishi comprising substantially of the limitations of the instant invention as discussed above except for the aperture diaphragm comprises an iris diaphragm and a turret having a plurality of openings. However, a variable aperture of a turret type is known per se. For instance, Nishi teaches an aperture comprising "iris diaphragm and a turret with a plurality of openings". (see figs.2a, 2b). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a variable aperture of a turret type as taught by Nishi in the device of Ushida as modified by Shiraishi for varying the numerical aperture of the projection optical system.

As to claims 5 and 16, Ushida et al as modified by Shiraishi lacks to show a cooling device with a "Peltier element". Using a "Peltier element" in a cooling mechanism is also well known in the art. For example, Nishi teaches Peltier element (30) for cooling the bottom face of the temperature adjustment plate (20). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ "Peltier element" as taught by Nishi into the cooling device of Shiraishi for the purpose of cooling the aperture stop and thus the aperture stop can be prevented from increasing its temperature due to absorption of light.

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Prior Art Made of Record

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


Shiraishi et al (U.S. Pat. 5,532,856) discloses a projection exposure apparatus having a cooling means for cooling a spatial filter of a projection optical system.

Kudo (U.S. Pat. 5,392,094) discloses an exposure apparatus comprises a projection optical system with a variable aperture device.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Henry Hung V Nguyen whose telephone number is 703-305-6462. The examiner can normally be reached on Monday-Friday (First Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on 703-308-2847. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7723 for regular communications and 703-305-7723 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4900.


(Henry) Hung V Nguyen
Examiner
Art Unit 2851

hvn
August 6, 2001